



## AT-AR770S

### Secure Gigabit VPN Router

#### AT-AR770S

- 2 x WAN combo ports (SFP or 10/100/1000TX)
- 4 x LAN 10/100/1000TX ports
- 2 x PIC slots
- 1 x Asynchronous console / modem port

#### Flexible High Speed WAN Options

The AT-AR770S is the first Allied Telesis router to offer gigabit connectivity for both the LAN switch and WAN Ethernet ports. Eth0 and Eth1 are combo ports. This means that they can make use of an SFP instead of the standard copper RJ-45 connection.

Both the SFP and RJ-45 physical ports are managed by the same interface IC, providing a single 'port' with two connectivity options. When using an SFP port on the AT-AR770S, the corresponding RJ-45 port is disabled. However, when the SFP transceiver is removed, the RJ-45 port becomes operational again.

#### Secure Modular Routing Solution

The AT-AR770S has been designed to meet the needs of small to medium enterprises/businesses or branch office businesses. The AT-AR770S offers significant advances in processing performance, Quality of Service (QoS), routing, remote connectivity and security.

#### Extensive VPN Capability

The AT-AR770S provides extensive IPsec-based VPN capability, allowing the interconnection of offices, remote tele-workers, and other users who require secure access to a corporate network. The integrated hardware acceleration, standard on the AT-AR770S, maximizes encryption throughput and removes the need to purchase a hardware upgrade package. The AT-AR770S is compatible with industry standard IPsec VPN clients.

#### Performance

The AT-AR770S provides superior performance over other secure VPN routers in this market space. While most secure routers have stateful firewalls with NAT, QoS, and IPsec VPN termination capability, very few can perform all three functions and still provide excellent performance with the mixed packet sizes seen in real networks. The AT-AR770S can support up to 1000 concurrent VPN tunnels or up to 500 Mbps AES or 3DES throughput.

This level of performance enables secure site-to-site VPNs over multiple WAN interfaces while still firewalling the local network across multiple LAN ports.

#### Key Features

##### Hardware

- 2 x SFP or 10/100/1000TX WAN interfaces
- 2 x Port Interface Card (PIC) slots
- 4 x 10/100/1000TX LAN ports
- 1 x Asynchronous console / modem port
- DMZ port: configurable on any of the WAN/LAN ports
- 128MB RAM
- 32MB Flash
- RoHS compliant

##### Security

- IP Filtering
- Stateful Inspection Firewall
- 802.1x
- NAT-T
- Authentication: RADIUS, TACACS, MD5, PAP, CHAP

##### VPN/Encryption

- DES, AES, 3DES encryption
- 5,000 configured IPsec VPN tunnels (1000 active tunnels)
- HW accelerated IPsec performance: Up to 500Mbps<sup>1</sup>
- Supports industry standard VPN clients

##### Manageability

- CLI management
- SNMPv3

#### Extensive routing support

- WAN load balancer
- Software QoS
- RIPv1 and v2
- OSPFv1 and v2
- GRE
- IPX
- VRRP
- IPv6 – optional
- BGP-4 – optional
- RIPng – optional

#### Multicast routing protocols

- PIM-DM
- PIM-SM
- DVMRP
- IGMPv2
- IGMP Snooping
- IPv6 Multicast – optional
- PIM6 – optional
- MLD – optional

#### Support for traditional network protocols

- X.25
- Frame Relay

<sup>1</sup> Performance figure estimates from pre-production units.

# AT-AR770S | Secure Gigabit VPN Router

## Security

In addition to hardware-based encryption, the AT-AR770S comes with other advanced security features such as traffic filtering with event logging. Traffic filtering uses the source and destination address, port, protocol and TCP packet type to provide control over traffic that passes through the AT-AR770S. A Stateful Inspection Firewall provides an increased level of security and complements the packet filtering function. HTTP and SMTP proxies on the AT-AR770S provide improved control over web and mail communications.

## Quality of Service

Allied Telesis' QoS implementation enables the AT-AR770S to dynamically identify high priority voice, video and application traffic, so that appropriate service levels can be maintained in congested networks. Advanced QoS allows voice, video, and data traffic to have QoS applied within individual IPSec tunnels, over GRE, as well as IPv6 to IPv4 tunnels.

## Comprehensive Management and Configuration

The AT-AR770S comes with a comprehensive suite of management features and is also compatible with SNMP-based management packages. An extensive command set is available via the Command Line Interface (CLI). Allied Telesis' SNMP support extends to SNMPv3 to provide secure management.

## WAN Load Balancer

The AT-AR770S' WAN Load Balancer enables the router to combine bandwidth from multiple WAN connections for increased throughput, redundancy and reliable WAN connectivity. When a router simultaneously connects to multiple WAN networks, the WAN Load Balancer will distribute the traffic based on any one of a number of selectable balancing algorithms. A typical example would be a router that has two Internet connections each exchanging data to remote sites via different Internet providers. In this case an outage limited to one network will not result in a loss of connectivity to these sites.

## Feature Summary

### Hardware Features

2 x WAN combo ports (SFP or 10/100/1000TX)  
4 x LAN 10/100/1000TX ports  
2 x PIC  
1 x Asynchronous console / Modem port  
DMZ port: Obtained by configuring one of the WAN or LAN ports

## Processor

833MHz  
Internal security encryption engine

## Memory

128MB Ram  
32MB Flash

## Power Characteristics

Input Voltage: 100-240 VAC, 50-60 Hz  
Max Power Consumption: 40W  
Internal Battery Backup (1 year)

## Physical

Dimensions: 1RU rack mount  
Depth 239mm, Width 440mm  
Height 44mm  
Weight: 2.95 kg

## Environmental

Operating Temp: 0°C to 50°C  
Storage Temp: -25°C to 70°C  
Operating relative humidity: 5 to 80% non-condensing  
Acoustic: General Office @ 40dB V. Measured in accordance with ANSI S12.10  
Operating Altitude: Up to 10,000 feet

## Approvals & Certifications

UL  
TUV  
UL60950-1  
CAN/CSA-C22.2 No. 60950-1-03  
EN60950-1  
AS/NZS 60950  
EN60825-1  
EN55022 class A  
EN55024  
FCC class A  
VCCI class A  
AS/NZS CISPR22 class A  
CE

## Reliability

MTBF: >120 000 hrs (telcordia methodology, data path only)

## Optional Extras

### Port Interface Cards:

AT-AR020 Single configurable E1/T1 interface that supports channelized/unchannelized Primary Rate ISDN/Frame Relay  
AT-AR021S (V3)<sup>2</sup>Single Basic Rate ISDN S/T interface  
AT-AR023 Single Synchronous port up to 2Mbps to an external CSU/DSU (AT-V.35-DTE-00 or AT-X.21-DTE-00 cable required)  
AT-AR024 Four Asynchronous RS-232 interfaces to 115Kbps

## Software Features

### Routing and Multicast

PPP and IP Routing  
RIP v1 & v2  
OSPF v1 & v2  
BGP-4 (optional)

## IPX

IGMPv2  
PIM-SM / DM  
DVMRP (including draft\_ietf\_idmr\_dvmrp\_v3\_10)  
DECNet

## WAN Protocols

X.25  
Frame Relay

## Security

IP Filtering  
Stateful Inspection Firewall  
NAT-T  
SMTP & HTTP Proxy  
802.1x  
Authentication: RADIUS, TACACS, MDS, PAP, CHAP  
SSH  
SSLv1

## VPN

L2TP  
GRE  
IPSec  
IKE  
ISAKMP  
PKI  
Encryption: DES, 3DES, AES  
Microsoft Windows XP VPN client interoperability  
Hardware acceleration

## QoS

Extensive Traffic classifiers of L2 to L5 traffic to allow appropriate queuing of traffic  
IP: IP source / destination address, TOS & DiffServ  
Ethernet: MAC source / destination, 802.1q  
TCP / UDP: Port numbers  
VoIP: RTP source & destination  
Queuing:

- Low latency queuing (LLQ)
- Class-based weighted fair queuing (CBWFQ)
- Deficit Round Robin (DRR)

Supported tunnel interfaces: PPP, L2TP, IPsec, GRE, RSVP

## Management

CLI  
SNMPv3

## IPv6

RIPng  
IPv6 RFC 2460  
Neighbour discovery RFC 2461  
Stateless address auto configuration RFC 2462  
ICMPv6 RFC 2463  
Transmission of IPv6 packets RFC 2464  
Connection of IPv6 domains via IPv4 clouds RFC 3056  
DHCPv6

## Country of Origin

China

<sup>2</sup> AR021S (V3) requires AlliedWare® Operating System version 2.9.1-13 or later

## Standards and Protocols

Software Release 2.9.1

### BGP-4

- RFC 1771 Border Gateway Protocol 4
- RFC 1966 BGP Route Reflection
- RFC 1997 BGP Communities Attribute
- RFC 1998 Multi-home Routing
- RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
- RFC 2439 BGP Route Flap Damping
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 2918 Route Refresh Capability for BGP-4
- RFC 3065 Autonomous System Confederations for BGP
- RFC 3392 Capabilities Advertisement with BGP-4

### Encryption

- RFC 1321 MD5
- RFC 2104 HMAC
- RFC 2451 The ESP CBC-Mode Cipher Algorithms
- FIPS 180 SHA-1
- FIPS 186 RSA
- FIPS 197 AES<sup>1</sup>
- FIPS 46-3 DES
- FIPS 46-3 3DES<sup>2</sup>

### Ethernet

- RFC 894 Ethernet II Encapsulation
- IEEE 802.1D MAC Bridges
- IEEE 802.1G Remote MAC Bridging
- IEEE 802.1Q Virtual LANs
- IEEE 802.2 Logical Link Control
- IEEE 802.3ac VLAN TAG
- IEEE 802.3u 100BASE-T and 802.3u 1000 Base-T
- IEEE 802.3x Full Duplex Operation

### General Routing

- RFC 768 UDP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 903 Reverse ARP
- RFC 925 Multi-LAN ARP
- RFC 950 Subnetting, ICMP
- RFC 1027 Proxy ARP
- RFC 1035 DNS
- RFC 1055 SLIP
- RFC 1122 Internet Host Requirements
- RFC 1142 OSI IS-IS Intra-domain Routing Protocol
- RFC 1144 Van Jacobson's Compression
- RFC 1256 ICMP Router Discovery Messages
- RFC 1288 Finger
- RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
- RFC 1334 PPP Authentication Protocols
- RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)
- RFC 1378 The PPP AppleTalk Control Protocol (ATCP)
- RFC 1518 CIDR
- RFC 1519 CIDR
- RFC 1542 BootP
- RFC 1552 The PPP Internetworking Packet Exchange Control Protocol (IPXCP)
- RFC 1570 PPP LCP Extensions
- RFC 1582 RIP on Demand Circuits
- RFC 1598 PPP in X.25
- RFC 1618 PPP over ISDN

### RFC 1661 The Point-to-Point Protocol (PPP)

- RFC 1662 PPP in HDLC-like Framing
- RFC 1701 GRE
- RFC 1702 GRE over IPv4
- RFC 1762 The PPP DECnet Phase IV Control Protocol (DNCP)
- RFC 1812 Router Requirements
- RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses
- RFC 1918 IP Addressing
- RFC 1962 The PPP Compression Control Protocol (CCP)
- RFC 1968 The PPP Encryption Control Protocol (ECP)
- RFC 1974 PPP Stac LZS Compression Protocol
- RFC 1978 PPP Predictor Compression Protocol
- RFC 1989 PPP Link Quality Monitoring
- RFC 1990 The PPP Multilink Protocol (MP)
- RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
- RFC 2125 The PPP Bandwidth Allocation Protocol (BAP) / The PPP Bandwidth Allocation Control Protocol (BACP)
- RFC 2131 DHCP
- RFC 2390 Inverse Address Resolution Protocol
- RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)
- RFC 2822 Internet Message Format
- RFC 2878 PPP Bridging Control Protocol (BCP)
- RFC 2661 L2TP
- RFC 3046 DHCP Relay Agent Information Option
- RFC 3232 Assigned Numbers
- RFC 3993 Subscriber-ID Sub-option for DHCP Relay Agent Option "IPX Router Specification", v1.2, Novell, Inc., Part Number 107-000029-001
- ISO 10589, ISO 10589 Technical Corrigendums 1, 2, 3, ISO Intermediate System-to-Intermediate System
- "ISO 8473, relevant parts of ISO 8348(X.213), ISO 8343/Add2, ISO 8648, ISO 8648, ISO TR 9577 Open System Interconnection"
- ISO 9542 End System to Intermediate System Protocol Encapsulation of IPsec Packets
- <http://www.iana.org/assignments/bootp-dhcp-parameters>
- BootP and DHCP parameters

### General Routing and Firewall

- RFC 3022 Traditional NAT
- draft-ietf-ipsec-nat-t-ike-08.txt Negotiation of NAT-Traversal in the IKE
- draft-ietf-ipsec-udp-encaps-08.txt UDP Encapsulation of IPsec Packets

### IP Multicasting

- RFC 1075 DVMRP
- RFC 1112 Host Extensions
- RFC 1812 Router Requirements
- RFC 2236 IGMPv2
- RFC 2362 PIM-SM
- RFC 2715 Interoperability Rules for Multicast Routing Protocols
- draft-ietf-idmr-dvmrp-v3-9 DVMRP
- draft-ietf-pim-dm-new-v2-04 PIM-DM
- draft-ietf-pim-sm-v2-new-09 PIM-SM

### IPsec

- RFC 1829 IPsec algorithm
- RFC 3173 IPComp - IPsec compression
- RFC 2395 IPsec Compression - LZS
- RFC 1828 IP Authentication using Keyed MD5
- RFC 2401 Security Architecture for IP
- RFC 2402 AH - IP Authentication Header

### RFC 2403 IPsec Authentication - MD5

- RFC 2404 IPsec Authentication - SHA-1
- RFC 2405 IPsec Encryption - DES
- RFC 2406 ESP - IPsec encryption
- RFC 2407 IPsec DOI
- RFC 2408 ISAKMP
- RFC 2409 IKE
- RFC 2410 IPsec encryption - NULL
- RFC 2411 IP Security Document Roadmap
- RFC 2412 OAKLEY
- RFC 3173 IPComp - IPsec compression

### IPv6

- RFC 1981 Path MTU Discovery for IPv6
- RFC 2080 RIPvng for IPv6
- RFC 2365 Administratively Scoped IP Multicast
- RFC 2375 IPv6 Multicast Address Assignments
- RFC 2460 IPv6
- RFC 2461 Neighbour Discovery for IPv6
- RFC 2462 IPv6 Stateless Address Autoconfiguration
- RFC 2463 ICMPv6
- RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
- RFC 2465 Allocation Guidelines for IPv6 Multicast
- RFC 2466 Management Information Base for IP Version 6: ICMPv6 Group
- RFC 2472 IPv6 over PPP
- RFC 2526 Reserved IPv6 Subnet Anycast Addresses
- RFC 2529 Transmission of IPv6 over IPv4 Domains without Explicit Tunnels
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2711 IPv6 Router Alert Option
- RFC 2851 Textual Conventions for Internet Network Addresses
- RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
- RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
- RFC 3307 Allocation Guidelines for IPv6 Multicast Addresses
- RFC 3315 DHCPv6
- RFC 3484 Default Address Selection for IPv6
- RFC 3513 IPv6 Addressing Architecture
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 3596 DNS Extensions to support IPv6
- RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
- Addresses Management Information Base for IP Version 6: Textual Conventions and General Group

### Management

- RFC 1155 MIB
- RFC 1157 SNMP
- RFC 1212 Concise MIB definitions
- RFC 1213 MIB-II
- RFC 1493 Bridge MIB
- RFC 1643 Ethernet MIB
- RFC 1657 Definitions of Managed Objects for BGP-4 using SMIv2
- RFC 2011 SNMPv2 MIB for IP using SMIv2
- RFC 2012 SNMPv2 MIB for TCP using SMIv2
- RFC 2096 IP Forwarding Table MIB
- RFC 2576 Coexistence between V1, V2, and V3 of the Internet-standard Network Management Framework
- RFC 2578 Structure of Management Information Version 2 (SMIV2)
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2665 Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 2674 Definitions of Managed Objects for Bridges with Traffic

# AT-AR770S | Secure Gigabit VPN Router

Classes, Multicast Filtering and Virtual LAN Extensions (VLAN)  
RFC 2790 Host MIB  
RFC 2819 RMON (groups 1,2,3 and 9)  
RFC 2856 Textual Conventions for Additional High Capacity Data Types  
RFC 2863 The Interfaces Group MIB  
RFC 3164 Syslog Protocol  
RFC 3289 Management Information Base for the Differentiated Services Architecture  
CDP  
RFC 3410 Introduction and Applicability Statements for Internet-Standard Management Framework  
RFC 3411 An Architecture for Describing SNMP Management Frameworks  
RFC 3412 Message Processing and Dispatching for the SNMP  
RFC 3413 SNMP Applications  
RFC 3414 User-based Security Model (USM) for SNMPv3  
RFC 3415 View-based Access Control Model (VACM) for the SNMP  
RFC 3416 Version 2 of the Protocol Operations for SNMP  
RFC 3417 Transport Mappings for the SNMP  
RFC 3418 MIB for SNMP  
RFC 3636 Definitions of Managed Objects for IEEE 802.3 MAUs  
RFC 3768 VRRP  
draft-ietf-bridge-8021x-00.txt Port Access Control MIB  
IEEE 802.1AB LLDP

## OSPF

RFC 1245 OSPF protocol analysis  
RFC 1246 Experience with the OSPF protocol  
RFC 2328 OSPFv2  
RFC 1586 OSPF over Frame Relay  
RFC 1793 Extending OSPF to Support Demand Circuits  
RFC 1587 The OSPF NSSA Option  
RFC 3101 The OSPF Not-So-Stubby Area (NSSA) Option

## QoS

RFC 2205 Reservation Protocol  
RFC 2211 Controlled-Load  
RFC 2474 DCSP in the IPv4 and IPv6 Headers  
RFC 2475 An Architecture for Differentiated Services  
RFC 2597 Assured Forwarding PHB Group  
RFC 2697 A Single Rate Three Color Marker  
RFC 2698 A Two Rate Three Color Marker  
RFC 3246 An Expedited Forwarding PHB (Per-Hop Behavior)  
IEEE 802.1p Priority Tagging

## RIP

RFC 1058 RIPv1  
RFC 2453 RIPv2  
RFC 2082 RIP-2 MD5 Authentication

## Security

RFC 959 FTP  
RFC 1413 IDP  
RFC 1492 TACACS  
RFC 1779 X.500 String Representation of Distinguished Names.  
RFC 1858 Fragmentation  
RFC 2284 EAP  
RFC 2510 PKI X.509 Certificate Management Protocols  
RFC 2511 X.509 Certificate Request Message Format  
RFC 2559 PKI X.509 LDAPv2  
RFC 2585 PKI X.509 Operational Protocols  
RFC 2587 PKI X.509 LDAPv2 Schema  
RFC 2865 RADIUS  
RFC 2866 RADIUS Accounting  
RFC 3280 X.509 Certificate and CRL profile

draft-grant-tacacs-02.txt TACACS+  
Draft-IETF-PKIX-CMP-Transport-Protocols-01 Transport Protocols for CMP  
draft-ylonen-ssh-protocol-00.txt SSH Remote Login Protocol  
IEEE 802.1x Port Based Network Access Control  
PKCS #10 Certificate Request Syntax Standard  
Diffie-Hellman

## Services

RFC 854 Telnet Protocol Specification  
RFC 855 Telnet Option Specifications  
RFC 856 Telnet Binary Transmission  
RFC 857 Telnet Echo Option  
RFC 858 Telnet Suppress Go Ahead Option  
RFC 932 Subnetwork addressing scheme  
RFC 951 BootP  
RFC 1091 Telnet terminal-type option  
RFC 1305 NTPv3  
RFC 1350 TFTP  
RFC 1510 Network Authentication  
RFC 1542 Clarifications and Extensions for the Bootstrap Protocol  
RFC 1985 SMTP Service Extension  
RFC 1945 HTTP/1.0  
RFC 2049 MIME  
RFC 2068 HTTP/1.1  
RFC 2156 MIXER  
RFC 2217 Telnet Com Port Control Option  
RFC 2821 SMTP

## SSL

RFC 2246 The TLS Protocol Version 1.0  
Draft-freier-ssl-version3-02.txt SSLv3

## STP / RSTP

IEEE 802.1t - 2001 802.1D maintenance  
IEEE 802.1w - 2001 RSTP

## X.25

RFC 1356 Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode  
ITU-T Recommendations X.25 (1988), X.121 (1988), X.25

## ISDN

ANSI T1.231-1997 Digital Hierarchy - Layer 1 In-Service Digital Transmission Performance Monitoring Standardization  
ANSI T1.403-1995 Telecommunications - Network-to-Customer Installation - DS1 Metallic Interface  
ANSI T1.408-1990 ISDN Primary Rate - Customer Installation Metallic Interfaces, Layer 1 Specification  
AT&T TR 54016-1989 Requirements for Interfacing Digital Terminal Equipment to Services Employing the Extended Superframe Format  
Austel TS 013.1:1990 General Requirements for Customer Equipment Connected to ISDN Basic Rate Access - Vol. 1: Customer Equipment Access Interface Specifications  
Bellcore SR-3887 1997 National ISDN Primary Rate Interface  
ETS 300 012:1992 Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles  
ETS 300 102-1:1990 Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control  
ETS 300 102-2:1990 Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams  
ETS 300 125:1991 Integrated Services Digital Network (ISDN); User-network interface data link layer specification;

Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441

ETS 300 153:1992 Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access (Candidate NET 3 Part I)

ETS 300 156:1992 Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access (Candidate NET 5)

ETS 300 011:1992 Integrated Services Digital Network (ISDN); Primary rate user-network interface; Layer 1 specification and test principles

G.706 (1988) Frame Alignment and CRC Procedures Relating to Basic Frame Structures Defined in G.704

G.794 (1988) Characteristics of 24-channel transmultiplexing equipments

German Monopol (BAPT 221) Type Approval Specification for Radio Equipment for Tagging and Identification

I.120 (1988) Integrated services digital networks (ISDNs)

I.121 (1988) Broadband aspects of ISDN

I.411 (1988) ISDN user-network interface reference configurations

I.430 (1988) Basic user-network interface - Layer 1 specification

I.431 (1988) Primary rate user-network interface - Physical layer specification

ITU-T G.703 Physical/electrical characteristics of hierarchical digital interfaces

ITU-T G.704 Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44736 kbit/s hierarchical levels

ITU-T G.706 Frame Alignment and CRC Procedures Relating to Basic Frame Structures Defined in G.704

ITU-T Q.922 ISDN data link layer specification for frame mode bearer services

ITU-T G.703 (1972) Physical/electrical characteristics of hierarchical digital interfaces

Japan NTT I.430-a Leased Line Basic Rate User-Network Interface Layer 1-Specification

New Zealand Telecom TNA 134 Telecom ISDN User-Network Interface; Layer 3: PART B Basic Call Control Procedures

Q.920 (1988) Digital subscriber Signalling System No.1 (DSS1) - ISDN user-network interface data link layer - General aspects  
Q.921 (1988) ISDN user-network interface - Data link layer specification

Q.930 (1988) Digital subscriber Signalling System No. 1 (DSS 1) - ISDN user-network interface layer 3 - General aspects

Q.931 (1988) Digital subscriber Signalling System No. 1 (DSS 1) - ISDN user-network interface layer 3 specification for basic call control

Rockwell Bt8370 Fully Intergrated T1/E1 Framer and Line Interface data sheet

Technical Reference of Frame Relay Interface, Ver. 1, November 1993, Nippon Telegraph and Telephone Corporation. Ver. 1, November 1993, Nippon Telegraph and Telephone Corporation.

ACA TS 013.2:1990 General Requirements for Customer Equipment Connected to ISDN Basic Rate Access, Vol 2: Conformance Testing Specifications

ACA TS 014.1:1990 General Requirements for Customer Equipment Connected to ISDN Primary Rate Access, Vol 1: Customer Access Interface Specifications

ACA TS 014.2:1990 General Requirements for Customer Equipment Connected to ISDN Primary Rate Access, Vol 2: Conformance Testing Specifications

## Frame Relay

ANSI T1SI Frame relay

RFC 1490, 2427 Multiprotocol Interconnect over Frame Relay

## Ordering Information

### AT-AR770S

Order number: 990-000818-00

Includes power cords for US, UK, Australia & Europe

## Port Interface Card (PIC) Options

### AT-AR020

Single software configurable E1/T1 interface that supports channelized/unchannelized Primary Rate ISDN/Frame Relay  
Order Number: 990-001304-00

### AT-AR021S (V3)<sup>2</sup>

(AT-AR021S VI card is not supported on the AT-AR770S)

Single basic rate ISDN S/T interface

Order Number: 990-002153-00

### AT-AR023

Single synchronous port up to 2Mbps to an external CSU/DSU (AT-V.35-DTE-00 or AT-X.21-DTE-00 cable required)

Order number: 990-001104-00

### AT-AR024

Four Asynchronous RS-232 interfaces to 115Kbps

Order number: 990-001105-00

## SFP Options<sup>3</sup>

### AT-SPFX/2

100BASE-FX 1310nm fiber up to 2km

### AT-SPFX/15

100BASE-FX 1310nm fiber up to 15km

### AT-SPFX/40

100BASE-FX 1310nm fiber up to 40km

### AT-SPTX

10/100/1000 BASE-T 100m Copper

### AT-SPSX

1000BASE-SX

GbE multi-mode 850nm fiber

### AT-SPLX10

1000BASE-LX

GbE single-mode 1310nm fiber up to 10km

### AT-SPLX40

1000BASE-LX

GbE single-mode 1310nm fiber up to 40km

### AT-SPLX40/1550

1000BASE-LX

GbE single-mode 1550nm fiber up to 40km

### AT-SPZX80

1000BASE-ZX

GbE single-mode 1550nm fiber up to 80km

## Feature License

### AT-AR700 – ADVL3UPGRD

AR700 series advanced Layer 3 upgrade – includes:

- IPv6
- BGP-4
- Server Load Balancing

Order Number: 980-10022-00

## About Allied Telesis

Allied Telesis is part of the Allied Telesis Group. Founded in 1987, the company is a global provider of secure Ethernet/IP access solutions and an industry leader in the deployment of IP Triple Play networks over copper and fiber access infrastructure. Our POTS-to-10G iMAP integrated Multiservice Access Platform and iMG intelligent Multiservice Gateways, in conjunction with advanced switching, routing and WDM-based transport solutions, enable public and private network operators and service providers of all sizes to deploy scalable, carrier-grade networks for the cost-effective delivery of packet-based voice, video and data services. Visit us online at [www.alliedtelesis.com](http://www.alliedtelesis.com).

## Service and Support

Allied Telesis provides value-added support services for its customers under its Net.Cover programs. For more information on Net.Cover support programs available in your area, contact your Allied Telesis sales representative or visit our website.

<sup>2</sup>AT-AR021S (V3) requires AlliedWare® Operating System version 2.9.1-13 or later

<sup>3</sup>Please check with your sales representative for ROHS compliance on SFP modules.